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Heat transfer enhancement using nanofluids in the compression exchanger in a solar Stirling engine

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Abstract: In this paper a improvement in the heat exchange of a solar Stirling engine during the compression phase was studied. The viability of using nanoparticles as ceramic oxide (Al_2O_3 in water) at different concentrations instead of conventional refrigerants (water or air) was evaluated. Since these systems could behave as non-Newtonian fluids the dynamic viscosity was measured, as well as other thermophysical properties. The results showed that the convective heat transfer coefficient could raise one order of magnitude respect to the conventional heat transfer fluids at moderately volume fractions (over 0.15).